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MEMORANDUM

TO: Judy Flook, Applied Environmental
FROM: Ann Sieben, Doty & Associates; Frank Blaha, Wright Water Engineers, Inc
DATE: January 21, 1993
SUBJECT: Responses to Comments on the Vadose Zone Technical Memorandum

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A memorandum was received from Gaynor Dawson, ICF Technology Incorporated, by Bob Benedetti, EG&G Rocky Flats and dated January 4, 1993. The subject line of the memorandum referenced the "Work Plan Review #1 - OU4 Vadose Zone Work Plan." The summarized conclusion of the review of the plan by the ICF team stated that the plan "...is directed to collection of a lot of data that will be of little or no use in conduct of the RI/FS..." The body of the comments includes a brief description of the requirements of an RI/FS for the purpose of our "...[facilitating] identification of any misunderstandings or misinterpretations..." Many misunderstandings and misinterpretations exist between the intent of the Vadose Zone Technical Memorandum (TM) and the comments received by Mr. Dawson. The Vadose Zone TM was developed as a stated requirement in the approved Phase I RFI/RI Work Plan for OU4 and is not in itself a stand-alone Work Plan. The Vadose Zone TM is a portion of the overall Phase I RFI/RI Work Plan which is being implemented concurrently with the Vadose Zone TM. The Phase I RFI/RI Work Plan is not a work plan for an RI/FS, but rather for a soils and source characterization for the solar ponds area (as required by the IAG). Clearly the vadose zone is of critical important in characterization of the soils and sources of contamination.

Many of the points raised in Mr. Gaynor's review of this TM are currently being evaluated by the Vadose Zone project team, but we feel that some of the background and history of this unit and the current project should be considered prior to incorporating major changes into the Vadose Zone TM. The purpose of this memorandum is to define the regulatory function and drivers for the TM and to clarify its role in the overall RFI/RI program.

Inter-Agency Agreement (IAG)

The IAG was signed in January 1991 by the Colorado Department of Health (CDH), EPA, and DOE to outline the methods and requirements for the environmental characterization and remediation of the RFP. The IAG program addresses RCRA and CERCLA issues in a program unique to the RFP that combines both RCRA and CERCLA issues for each Operable Unit (OU). This combined approach was necessary to avoid problems related to authority questions that have historically been an issue between CDH and EPA at other Superfund sites in Colorado (especially the Rocky Mountain Arsenal). Although the IAG requires general compliance with both RCRA and CERCLA, RCRA regulations apply somewhat more heavily to remedial investigations at OU4 because this site was identified in earlier RCRA Part A and Part B Permit Applications as a RCRA interim status unit. In fact, RCRA interim status closure plans were submitted for OU4 in 1986, 1987, and 1988. The 1986 and 1987 interim status closure plans for OU4 were rejected by the Agencies due partly to an insufficient level of detail in the site characterization data

and proposed characterization plans. The 1988 interim status closure plan was never approved nor denied by the Agencies because the IAG process replaced the interim status closure plan process for this unit prior to completion of the agency review.

In accordance with the IAG, the CERCLA terms "Remedial Investigation" and "Feasibility Study" as used in this program are considered equivalent to the RCRA terms "RCRA Facility Investigation" and "Corrective Measures Study." It was agreed upon in the IAG that Phase I and Phase II RCRA Facility Investigations/Remedial Investigations (RFI/RIs) would be conducted at Operable Unit 4 (OU4) with CDH as the lead regulatory agency. A CMS/FS is currently scheduled for Spring 1997. The IAG identifies required actions, deliverables, and milestones for the OU4 characterization. A Phase I RFI/RI Work Plan is a required deliverable for OU4 and specific goals are outlined in the IAG. In accordance with the IAG, a Phase I RFI/RI Work Plan for OU4 was submitted and approved by the appropriate groups and the implementation of the approved Work Plan is currently underway.

Phase I RFI/RI Work Plan Requirements

The objectives of the Phase I RFI/RI Work Plan are to characterize source materials and soils at OU4 and to provide a Baseline Risk Assessment. A subsequent Phase II RFI/RI will investigate the nature and extent of surface water, groundwater, and air contamination and evaluate contaminant fate and transport. The approved Phase I RFI/RI Work Plan addresses characterization of source materials and soils including surficial soils, vadose zone materials, and the interceptor trench system. It is stated in the required Field Sampling Plan of the Work Plan that the vadose zone monitoring objectives would be developed as a work element within the OU4 Phase I RFI/RI effort and will be presented as a technical memorandum.

Vadose Zone TM Objectives

Technical Memoranda are considered to be secondary documents in the IAG program. They are designed to document the need for additional data and method for data collection. Technical Memoranda are attached as amendments to approved Work Plans after approval by EPA and CDH. The Vadose Zone TM was prepared in accordance with the approved Phase I RFI/RI Work Plan. The preliminary objectives for the vadose zone investigations were stated in the Work Plan:

- Characterize active vadose zone migration pathways.
- Develop methodologies for closure and post-closure monitoring.

The objectives in the final technical memorandum were refined:

- Characterize vadose zone soil contamination and active migration pathways within the vadose zone, and acquire an adequate understanding of the site to predict how the vadose zone will respond to changes in the system.

- Develop a vadose zone data base to support preparation of the Baseline Risk Assessment, the CMS/FS, and assist in development of monitoring approaches.

Excessive Amounts of Data Required to be Generated

Mr. Dawson has stated that it appears that considerable amounts of data are required to be collected in the Vadose Zone TM; data that may not all be needed from a practical viewpoint. We feel that the level and specificity of data to be generated are consistent with the level of detail that the Agencies require for such activities at the RFP, which is typically of a more detailed nature than appears to be required at other sites. For example, all attempts at the RFP to limit analyte lists to those compounds indicative of a particular unit or release have failed. The Agencies have consistently required that an extensive list of analytes be analyzed in environmental investigations at the RFP, and those analytes are identified in the IAG. Similarly, the Agencies have consistently stated that the subsurface characterization at the solar ponds is inadequate even though a considerable number of boreholes and wells have been completed in the area. For example, the following is stated regarding OU4 in Table 5 of the IAG Attachments: "The Phase I and Phase II reports shall at a minimum contain information to characterize the nature, rate and extent of contamination; define pathways and methods of migration; identify areas threatened by releases from the facility; and determine short and long-term threats to human health and the environment." The Agencies have also expressed more specific concerns regarding site characterization in their comments on the interim status closure plans for the solar ponds as well as in their comments on the annual RCRA groundwater monitoring report. Furthermore, meetings had been held with the Agencies to discuss the nature and scope of the vadose zone characterization work. The Vadose Zone TM has been reviewed, commented on, and conditionally approved by the Agencies for implementation.

Evaluation of Existing Work Plan

The first paragraph of Mr. Dawson's comments in this section suggests that much of the data to be collected regarding the temporal and spatial details of contaminant migration in the vadose zone will be irrelevant to our upcoming work because the recharge conditions will change significantly in the future. Although one possible objective of our work is to identify how soils and groundwater became contaminated, we are much more interested in obtaining data and understanding for the site sufficient to predict how contaminants already in place in soils and groundwater will behave in the future under

different hydraulic conditions. This could be critical to design of the remedial action because a relatively large area near the solar ponds (on the order of 20 to 30 acres) have contaminated soils and groundwater present. A possible remedial action is the capping of contaminated soils in the immediate vicinity of the solar ponds, and allowing the nitrate contamination in other soils near the solar ponds to leach out into the groundwater that is collected in the french drain system north of the solar ponds.

The second paragraph of Mr. Dawson's comments states that based on available data it appears that the soil gas survey is not a needed action. One of the reasons that the soil gas survey is being pursued is that it is an element of the approved RFI/RI Work Plan, and also because there has been a lingering question regarding the presence of volatile organic compounds (VOCs) in RCRA groundwater monitoring wells that are located hydraulically upgradient of the solar ponds. The Agencies have stated that the presence of VOC contamination in these wells constitutes a violation of the RCRA regulations for groundwater monitoring because upgradient wells are to be unimpacted by the unit they are monitoring. To data the Agencies have not accepted the argument that VOC contamination is simply not indicative of solar pond operations because attempts were made during their use to minimize the input of organics to the ponds (including VOCs). The fact that VOC contamination of solar pond water and sludge is generally not present, and in the parts per billion range if present, has not been a compelling argument to the Agencies. The RFP has stated that the VOC contamination present in the hydraulically upgradient wells is due to contamination from some other unit. The Agencies have stated that they require additional proof that this is actually true, and the soil gas survey may help to further prove this point.

The third paragraph of Mr. Dawson's comments questions the extensive list of analytes to be analyzed in samples from the solar pond area. As stated above, this list of analytes is the approved and required list for sampling and is included in the IAG.

The other recharge and vadose zone studies being conducted near OU4 may not provide sufficient characterization of recharge conditions for our uses. This other study is being conducted immediately under sludge dewatering beds that create significantly different hydraulic conditions than will be experienced on the hillside north of the solar ponds. Similarly, the Agencies have typically required some level of site-specific data for each operable unit under study. Furtermore, due to differences in compaction, fill material, and lithology at the RFP, there may be significant variability throughout the RFP that warrents the generation of site-specific data. For these reasons, we feel that it is necessary to develop data on at least some site-specific recharge conditions at OU4.

We agree that a geophysical survey to map the top of bedrock should be completed in the solar pond area. We are currently pursuing the development and implementation of such a study.

Regarding the storage of data on RFEDs, all data generated from this study will be placed on the RFEDs system and will be controlled by EG&G. The contractors in-house GIS system will be used for preparation of the RFI/RI Report that describes the results of the field work currently being conducted.

Summary

It is believed that the data to be collected in this vadose zone characterization will all be used in the course of the CMS/FS activities for OU4. The movement of contaminants in the vadose zone may prove critical in evaluation of the preferred remedial action due to the large area of soils and groundwater already contaminated. The vadose zone characterization work is not strictly focused on the under-pond area, but includes the overall hillside north and east of the solar ponds. The understanding of movement of contaminants in the vadose zone could play a critical role in remedy selection.

The exact actions being implemented for vadose zone characterization are being constantly reviewed and modified based on all available subsurface, field, and other data. A number of modifications to the actions proposed in the Vadose Zone TM have already been implemented and will be documented in the RFI/RI Report. The comments submitted by Mr. Dawson will also be considered during the implementation of, and potential changes to, the field activities identified in the technical memorandum. The recommended actions that concluded Mr. Dawson's memorandum are generally already part of the overall RFI/RI Work Plan for field investigations (which includes as a part of these studies the vadose zone TM), or have recently been identified as omissions that needed to be addressed.